Abstract

Methods and apparatus for decoding codewords
using message passing decoding techniques which are
particularly well suited for use with low density parity
check (LDPC) codes and long codewords are described. The
described methods allow decoding graph structures which are
largely comprised of multiple identical copies of a much
smaller graph. Copies of the smaller graph are subject to
a controlled permutation operation to create the larger
graph structure. The same controlled permutations are
directly implemented to support message passing between the
replicated copies of the small graph. Messages
corresponding to individual copies of the graph are stored
in a memory and accessed in sets, one from each copy of the
graph, using a SIMD read or write instruction. The graph
permutation operation may be implemented by simply
reordering messages, e.g., using a cyclic permutation
operation, in each set of messages read out of a message
memory so that the messages are passed to processing
circuits corresponding to different copies of the small
graph.